

### **REMARKS**

Claims 1-4, 6, 7, and 10-12 are currently pending. Claim 1 is currently amended.

#### **Rejection under 35 U.S.C. §103(a) – Claims 1-3, 6, 7 and 10**

Claims 1-3, 6, 7 and 10 are rejected under 35 U.S.C. §103(a) as allegedly obvious over U.S. Patent No. 4,184,004 to Pines et al. (“Pines”) in view of U.S. Patent No. 5,539,013 to Eckberg et al. (“Eckberg”). Applicants respectfully traverse this rejection.

The present invention is related to a polymer obtained by selectively introducing the epoxy group through a siloxane structure to the terminal of a main skeleton comprising a saturated hydrocarbon polymer or a vinyl polymer, and thereby, the problems of epoxidation by peroxide oxidation can be solved and a plurality of epoxy groups can be introduced, as described in the background of the present specification.

Independent claim 1 is drawn to an organic polymer having (a) a main skeleton comprising a saturated hydrocarbon polymer or a vinyl polymer, and (b) epoxy-containing silicon groups at its ends. Due to the presence at its ends of the epoxy-containing silicon groups, which serve as curable points, the claimed organic polymer can be cured, whereby the resulting cured product retains the characteristics of the main chain skeleton of the polymer. *See* the specification at paragraph [0120]. In the case of the saturated hydrocarbon polymer, the main chain skeleton may impart to the cured product the characteristics of excellent heat resistance, low moisture permeability, low moisture absorption, and low gas permeability. *See* the specification at paragraph [0123]. In the case of the vinyl polymer, the cured product may exhibit excellent weather resistance, flexibility, and compatibility with other components. *See* paragraph [0125].

Pines fails to disclose or suggest all the limitations of claim 1, and all claims dependent therefrom. Specifically, Pines does not disclose an organic polymer having a main skeleton comprising a saturated hydrocarbon polymer or a vinyl polymer, modified by a siloxane having an epoxy group at the polymer's ends. Pines describes only an organosilicone terpolymer having a main chain skeleton of an organosilicone that is modified by epoxy-polyoxyalkylene. Although the claimed organic polymer of the present invention contains an organosiloxane unit

at the polymer's ends, the maximum number of the unit  $m+n$  is only 20, and the organosiloxane unit is not a silicone polymer as described in Pines. Furthermore, the main skeleton is quite different. The polymer of Pines necessarily contains polyoxyalkylene structure, which is not required in the claimed organic polymer. Thus, Pines does not disclose a main skeleton of a hydrocarbon polymer or vinyl polymer. Additionally, the Examiner admits "Pines et al. does not teach a polymer with epoxy containing siloxane at both ends" (Office Action, page 3). Thus, Pines does not disclose all the limitations of claim 1.

Eckberg does not cure the deficiencies of Pines. Eckberg discloses a polymer having a silicone main chain skeleton and epoxy-containing siloxane groups at both ends. *See, e.g.*, the Experimental section. Eckberg discloses flexible, UV curable, epoxysilicone-polyether linear coatings, which are obtained by incorporation of polyether block segments into linear SiH-containing silicone backbones, which may be followed by conversion of SiH-containing silicone polyethers into their epoxy-containing linear block copolymer derivatives to make the silicone soft. Furthermore, the main skeleton is quite different. The polymer of Eckert necessarily contains polyoxyalkylene structure, which is not necessary in the present invention. Thus, Eckberg does not disclose a main skeleton of a hydrocarbon polymer or vinyl polymer. Further, in Eckberg, the incorporation of the polyether block (polyoxyalkylene) into the silicone backbone greatly increases the flexibility and elastomeric properties of the polymer as compared to those of a silicone of similar molecular weight without the polyether block. *See* col.11, lines 4-8. That is, the properties of the polyoxyalkylene polymer disclosed in Eckberg are derived mainly from the silicone backbone, with additional properties imparted by the polyether block. In contrast, the properties of the polymer claimed in the present invention are derived from the organic polymer backbone, and its silicone groups are used as mainly curable points.

Furthermore, it would not be obvious to combine Pines and Eckberg because the polymers disclosed by Pines and Eckberg have different main skeletons, and there is no teaching that the main skeletons disclosed by Pines and Eckberg are interchangeable. Thus, there is no teaching, motivation, or suggestion in the prior art to modify the polymer of Pines with the disclosures of Eckberg. Moreover, even if, *arguendo*, a person of ordinary skill in the art were to modify the polymer of Pines based on the disclosures of Eckberg, such combination would not arrive at the claimed organic polymer. Applicants maintain, as discussed above, that Pines and

Eckberg, alone or in combination, do not teach an organic polymer having (a) a main skeleton comprising a saturated hydrocarbon polymer or a vinyl polymer, and (b) epoxy-containing silicon groups at its ends as claimed. That is, the cited references do not teach every element of the pending claims. Further, applicants assert that there is no teaching in Eckberg that would suggest to a person skilled in the art that the polymer disclosed in Pines should be modified to predictably produce an organic polymer having (a) a main skeleton comprising a saturated hydrocarbon polymer or a vinyl polymer, and (b) epoxy-containing silicon groups at its ends, as claimed.

Thus, for at least these reasons, applicants maintain that independent claim 1, and claims 2, 3 6, 7 and 10 dependent therefrom, are not obvious over Pines in view of Eckberg. Withdrawal of this ground of rejection is therefore respectfully requested.

**Rejection under 35 U.S.C. §103(a) – Claims 4 and 11**

Claims 4 and 11 are rejected under 35 U.S.C. §103(a) as allegedly obvious over Pines in view of Eckberg in further view of U.S. Publication No. 2001/0031315 to Okamoto et al. (“Okamoto”) in further view of U.S. Publication No. 2002/0137841 to Nakagawa et al. (“Nakagawa”). Applicants respectfully traverse this rejection. Pine and Eckberg do not disclose or suggest all the limitations of claim 1 and Okamoto and Nakagawa do not cure these deficiencies. The polymers disclosed in Okamoto and Nakagawa do not have any epoxy-containing silicon groups at the ends of the polymers. Furthermore, it would not be obvious to combine Pines and Eckberg with Okamoto and/or Nakagawa because the polymers disclosed by Okamoto and Nakagawa do not have the same main skeletons as the polymers disclosed by Pines and Eckberg, and there is no teaching the main skeletons disclosed are interchangeable. Applicants therefore respectfully request that the present ground of rejection be withdrawn.

**Rejection under 35 U.S.C. §103(a) – Claim 12**

Claim 12 is rejected under 35 U.S.C. §103(a) as allegedly obvious over Pines in view of Eckberg in further view of U.S. Publication No. 2002/0137841 to Nakagawa et al. (“Nakagawa”). Applicants respectfully traverse this rejection. Pine and Eckberg do not disclose or suggest all the limitations of claim 1 and Nakagawa does not cure these deficiencies.

Furthermore, it would not be obvious to combine Pines and Eckberg with Nakagawa because the polymers disclosed by each of the references have different main skeletons, and there is no teaching the main skeletons disclosed are interchangeable.

**Double Patenting Rejection**

Claims 1-3, 4, 6 and 7 are rejected on the ground of nonstatutory obviousness-type double patenting as being allegedly unpatentable over claims 1, 5, 6, 7, 8 of co-pending Application No. 11/373,306. Applicants submit a terminal disclaimer herewith and thus this rejection is moot.

**Conclusion**

Although no fees are believed to be due, the Office may charge any additional fees required or credit any overpayments, to Deposit Account No. 11-0600.

The Examiner is invited to contact the undersigned at 202-220-4200 to discuss any matter regarding this application.

Respectfully submitted,

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